

Hawaii Institute of Marine Biology

University of Hawaii

P.O. Box 1106, Kailua, Hawaii 96734 USA

(808) 247-5297 Fax: (808) 247-5831

December 16, 1998

Office of Naval Research
Program Officer Robert Gisiner (ONR 335)
Ballston Centre Tower One
800 N. Quincy Street
Arlington VA 22217-5660

Final Technical Report Grant N00014-97-1-0892 (Project terminated 31 March 1998).

"Accelerated Minority Institution Low Frequency Odontocete Hearing"

We have tested the hearing of bottlenose dolphins, Risso's dolphins, and False killer whales using both the behavioral techniques and the envelope following response evoked auditory potential procedure. We have found a very good correlation between the two procedures. We have attempted to use the otoacoustic emissions technique to examine dolphin hearing but found that it was necessary to further define the sound path to the odontocete ear. Using a voluntarily beached animal we found that there are multiple sound paths to the inner ear.

We are testing the temporary threshold shifts of the bottlenosed dolphin. The animal is trained to station in a hoop device and to go hit a paddle when a pure tone sound is presented. If no sound is presented the animal stays in the hoop station. Either way, correct responses are reinforced. We then start with a comfortable level of sound and gradually reduce its level across trials until the animal makes an error and fails to report the sound. We then gradually increase the sound until the animal once again correctly reports it. This technique establishes the threshold. After the threshold is established the animal is exposed to loud sounds. Although we have played sounds up to 150 dB for up to 20 minutes, the animal has not yet demonstrated a temporary threshold shift.

We anticipate continuing this work with a follow-on proposal.

DTIC QUALITY INSPECTED &

DISTRIBUTION STATEMENT A

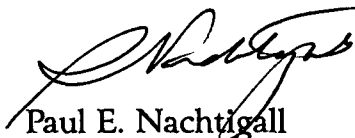
Approved for public release
Distribution Unlimited

19981229 044

Hawaii Institute of Marine Biology

Page: 2

December 16, 1998

A handwritten signature in black ink, appearing to read "P. Nachtigall", written over the printed name.

Paul E. Nachtigall

Director, Marine Mammal Research Program

Copies to:

ONR Seattle Regional Office

Director, NRL

DTIC

Dr. George Losey, University of Hawaii

REPORT DOCUMENTATION PAGE

OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 16 Dec 1998	3. REPORT TYPE AND DATES COVERED Final Technical Report	
4. TITLE AND SUBTITLE Accelerated Minority Institution Low Frequency Odontocete Hearing			5. FUNDING NUMBERS N 00014-97-1-0892 97 PR 06814-00 335 N68892 N66474 OW411	
6. AUTHOR(S) George S. Losey Paul E. Nachtigall				
7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(ES) University of Hawaii 2530 Dole St., Sakamaki Hall D200 Honolulu, HI 96822			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAMES(S) AND ADDRESS(ES) Office of Naval Research 800 N. Quincy St. Arlington, VA 22217-5660			10. SPONSORING / MONITORING AGENCY REPORT NUMBER R-1-4576-03-97	
11. SUPPLEMENTARY NOTES				
a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release			12. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) We have tested the hearing of bottlenose dolphins, Risso's dolphins, and False killer whales using both the behavioral techniques and the envelope following response evoked auditory potential procedure. We have found a very good correlation between the two procedures. We have attempted to use the otoacoustic emissions technique to examine dolphin hearing but found that it was necessary to further define the sound path to the odontocete ear. Using a voluntarily beached animal we found that there are multiple sound paths to the inner ear. We are testing the temporary threshold shifts of the bottlenosed dolphin. The animal is trained to station in a hoop device and to go hit a paddle when a pure tone sound is presented. If no sound is presented the animal stays in the hoop station. Either way, correct responses are reinforced. We then start with a comfortable level of sound and gradually reduce its level across trials until the animal makes an error and fails to report the sound. We then gradually increase the sound until the animal once again correctly reports it. This technique establishes the threshold. After the threshold is established the animal is exposed to loud sounds. Although we have played sounds up to 150 dB for up to 20 minutes, the animal has not yet demonstrated a temporary threshold shift.				
14. SUBJECT TERMS Low Frequency Sound Hearing			15. NUMBER OF PAGES 3	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

ATTACHMENT NUMBER 1

REPORTS AND REPORT DISTRIBUTION

REPORT TYPES

- (a) Performance (Technical) Report(s) (Include letter report(s)) Frequency: Annual
- (b) Final Technical Report, issued at completion of Grant.
NOTE: Final Technical Reports must have a SF-298 accompanying them.
- (c) Final Financial Status Report (SF 269)
- (d) Final Patent Report (DD 882)

REPORTS DISTRIBUTION		
ADDRESSEES	REPORT TYPES	NUMBER OF COPIES
Office of Naval Research Program Officer Robert Gisiner ONR 335 Ballston Centre Tower One 800 North Quincy Street Arlington, VA 22217-5660	(a) & (b) ✓ w/(SF-298's)	3
Administrative Grants Officer OFFICE OF NAVAL RESEARCH REGIONAL OFFICE SEATTLE 1107 NE 45TH STREET SUITE 350 SEATTLE, WA 98105-4631	(c), (d) & SF-298's only for (a) & (b) ✓	1
Director, Naval Research Laboratory Attn: Code 5227 4555 Overlook Drive Washington, DC 20375-5326	(a) & (b) ✓ w/(SF-298's)	1
Defense Technical Information Center 8725 John J. Kingman Road STE 0944 Ft. Belvoir, VA 22060-6218	(a) & (b) ✓ w/(SF-298's)	2
Office of Naval Research Attn: ONR 00CC1 Ballston Centre Tower One 800 North Quincy Street Arlington, VA 22217-5660	(d)	1

If the Program Officer directs, the Grantee shall make additional distribution of technical reports in accordance with a supplemental distribution list provided by the Program Officer. The supplemental distribution list shall not exceed 250 addresses.

* For report types (a) and (b), send only a copy of the transmittal letter to the Administrative Contracting Officer; do not send actual reports to the Administrative Contracting Officer.